

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A ranging and positioning system to measure a distance between two radio sets which send and receive packets to and from each other and to determine a relative position of such two radio sets, said system ~~being characterized in that~~ the comprising:

a sending radio set configured to ~~transmits~~ transmit packets[[,]];

[[the]] a receiving radio set configured to ~~receives~~ receive the packets and then ~~sends~~ send them the packets back to the sending radio set after a certain length of time corresponding to an integral multiple of a prescribed unit time, [[and]]

wherein the sending radio set calculates the time required for the packets to [[go]] be transmitted to, and, return and come back from the receiving radio set by subtracting the integral multiple of a prescribed unit time from the time taken from transmission of packets to reception of packets, thereby determining the distance between the sending and receiving radio sets according to the time required for the packets to ~~go and come back~~ be transmitted and return.

Claim 2 (Original): The ranging and positioning system as defined in Claim 1, wherein the prescribed unit time is determined from the quotient of the distance over which communication by the radio sets is possible divided by the velocity at which radio signals propagate.

Claim 3 (Currently Amended): The ranging and positioning system as defined in Claim 1, wherein the sending radio set measures the time taken from [[its]] transmission of the packets to [[its]] reception of the packets from the receiving radio set each time the

sending radio set communicates with the receiving radio set, and the sending radio set renews the result of distance measurement ~~time to~~ each time.

Claim 4 (Original): The ranging and positioning system as defined in Claim 1, wherein the relative position is used after the result of measurement has been verified by the intensity of received signals and/or the result of packet demodulation.

Claim 5 (Currently Amended): The ranging and positioning system as defined in Claim 1, wherein each radio set has memory in which to store a list of ~~[[its]]~~ neighboring radio sets and to store ranging data of itself and each of ~~[[its]]~~ the neighboring radio sets, and renews the content of memory each time it performs ranging.

Claim 6 (Currently Amended): The ranging and positioning system as defined in Claim 5, wherein each radio set acquires the ranging information possessed by ~~[[its]]~~ neighboring radio sets and determines ~~[[it]]~~ a position relative to ~~[[its]]~~ the neighboring radio sets from the thus acquired ranging information and its own ranging information.

Claim 7 (Original): The ranging and positioning system as defined in Claim 5, wherein one stationary radio set possesses information indicating that it is stationary and other radio sets detect this information by communication with the stationary radio set, thereby determining their respective positions relative to the stationary radio set.

Claim 8 (Original): The ranging and positioning system as defined in Claim 1, wherein communication between two radio sets is accomplished twice in such a way that the time required for the receiving radio set to return packets is changed, so that the sending radio set cancels, by using the results of two measurements, errors resulting from the accuracy of measurements of the prescribed time by the receiving radio set.

Claim 9 (Currently Amended): The ranging and positioning system as defined in Claim 1, wherein two or more radio sets are arranged such that a specific positional relation is established among their antennas and each radio set fills the gap between the nominal value and the actual value of the time taken from ~~[[its]]~~ a corresponding detection of packets to ~~[[its]]~~ the transmission of packets by using the result of measurement compared with the known relative distance.

Claim 10 (Currently Amended): The ranging and positioning system as defined in Claim 1, wherein two or more radio sets are arranged such that a specific positional relation is established among their antennas and each radio set corrects errors of ~~its own~~ an oscillator from the result of measurement compared with the known relative distance.

Claim 11 (Currently Amended): A ranging and positioning method for measuring a distance between two radio sets which send and receive packets to and from each other and to determine a relative position of such two radio sets, said method comprising:

~~a step in which the~~ transmitting packets from a sending radio set transmits packets, a
~~step in which the~~

receiving the packets at a receiving radio set receives packets and then returns;

returning the packets after a lapse of time corresponding to an integral multiple of a prescribed unit time from the receiving radio set[[,]];

~~a step in which the sending radio set counts~~ determining the time taken from transmission of packets from the sending radio set, to reception of returned packets to the sending radio set[[,]];

~~a step in which the sending radio set calculates~~ calculating the time required for the packets to ~~go and come back~~ be transmitted and returned by subtracting the integral multiple of the prescribed unit time from the counted time[[,]]; and ~~a step in which the sending radio~~

~~set determines~~

determining the distance between the sending radio set and the receiving radio set from the time required for packets to ~~go and come back~~ be transmitted and returned.

Claim 12 (Original): The ranging and positioning method as defined in Claim 11, wherein the prescribed unit time is determined from the quotient of the distance over which communication by the radio sets is possible divided by the velocity at which wireless signals propagate.

Claim 13 (Original): The ranging and positioning method as defined in Claim 11, wherein distance measurement is executed only when the result of measurement by the radio set is verified by the intensity of received signals and/or the result of packet demodulation.

Claim 14 (Currently Amended): The ranging and positioning method as defined in Claim 11, ~~which further comprises~~ comprising a step in which each radio set stores;
storing a list at each radio set of ~~[[its]]~~ neighboring radio sets and the ranging data of itself ~~and each of its neighboring radio sets~~.

Claim 15 (Currently Amended): The ranging and positioning method as defined in Claim 14, ~~which further comprises;~~

~~a step in which each radio set acquires~~ acquiring at each radio set the ranging information possessed by its neighboring radio sets~~[[,]]~~_i and

~~a step in which each radio set determines its~~ determining a position of each radio set relative to its neighboring radio sets from the thus acquired ranging information and its own ranging information.

Claim 16 (Currently Amended): The ranging and positioning method as defined in

Claim 14, ~~which further comprises~~ comprising: ~~a step in which each radio set detects~~
detecting the information of other stationary radio sets at each radio set by
communication with them, thereby determining its position relative to the stationary radio set.

Claim 17 (Currently Amended): The ranging and positioning method as defined in
Claim 11, ~~which further comprises~~ comprising:
~~a step in which the receiving radio set carries~~ carrying out communication twice by the
receiving radio set in such a way that the time required for the receiving radio set to return
packets is changed, so that the sending radio set cancels, by using the results of two
measurements, errors resulting from the accuracy of measurements of the prescribed time by
the receiving radio set.

Claim 18 (Currently Amended): The ranging and positioning method as defined in
Claim 11, ~~which further comprises~~ comprising:
~~a step in which two or more radio sets are arranged~~ arranging two or more radio sets
such that a specific positional relation is established among their antennas and each radio set
fills the gap between the nominal value and the actual value of the time taken from ~~[[its]]~~ a
corresponding detection of packets to ~~[[its]]~~ the transmission of packets by using the result of
measurement compared with the known relative distance.

Claim 19 (Currently Amended): The ranging and positioning method as defined in
Claim 11, ~~which further comprises~~ comprising:
~~a step in which two or more radio sets are arranged~~ arranging two or more radio sets
such that a specific positional relation is established among their antennas and each radio set
corrects errors of ~~[[its]]~~ a oscillator by using the result of measurement compared with the
known relative distance.

Claim 20 (Currently Amended): A radio communication apparatus for ranging and positioning by ~~means of~~ packet transmission and reception, ~~which comprises~~ comprising:

means ~~[[of]]~~ for transmitting packets~~[[,]]~~;

means ~~[[of]]~~ for detecting returned packets after a lapse of time that follows packet transmission which is equivalent to an integral multiple of a prescribed unit time~~[[,]]~~;

means ~~[[of]]~~ for measuring time that has elapsed from transmission of packet to detection of returned packets by subtracting the integral multiple from the elapsed time~~[[,]]~~;

and

means ~~[[of]]~~ for calculating the distance to the recipient of packets from the thus measured time.

Claim 21 (Original): The radio communication apparatus as defined in Claim 20, wherein the prescribed unit time is derived from the quotient of the distance over which communication with the radio communication apparatus is possible divided by the velocity at which radio signals propagate.

Claim 22 (Currently Amended): The radio communication apparatus as defined in Claim 20, wherein the packet detecting means detects the position for packet detection ~~with the help of~~ through correlation between the receiving data and the spreading code.

Claim 23 (Currently Amended): The radio communication apparatus as defined in Claim 20, wherein the means ~~[[of]]~~ for calculating the distance to the recipient of packets determines the time taken by the packet receiving radio set from its packet detection to its packet transmission on the basis of the integral multiple of the prescribed unit time, and converts for ranging the remainder after subtraction of the measured time from the thus determined time and the processing time of its own, into the propagation distance to the packet receiving radio set.

Claim 24 (Currently Amended): The radio communication apparatus as defined in Claim 20, wherein the means ~~[[of]]~~ for calculating the distance judges the validity of the result of measurement by the radio set on the basis of the intensity of received signals and/or the result of packet demodulation, and, if the result of judgment is affirmative, executes the measurement of distance.

Claim 25 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which~~ further ~~comprises~~ comprising:

means ~~[[of]]~~ for controlling the sending power of the radio set on the basis of the result of ranging by the means ~~[[of]]~~ for calculating the distance.

Claim 26 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which~~ further ~~comprises~~ comprising:

means ~~[[of]]~~ for controlling or limiting a specific function on the basis of the result of ranging by the means ~~[[of]]~~ for calculating the distance.

Claim 27 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which~~ further ~~comprises~~ comprising:

means ~~[[of]]~~ for performing communication for a specific function relating to security only when the relative distance is less than a prescribed value on the basis of the result of measurement by the means ~~[[of]]~~ for calculating the distance.

Claim 28 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which~~ further ~~comprises~~ comprising:

means ~~[[of]]~~ for reducing the sending power and/or increasing the transmission rate according to the result of ranging by the means ~~[[of]]~~ for calculating the distance, thereby

intentionally making reception difficult for radio sets excluding a specific recipient.

Claim 29 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which further comprises~~ comprising:

means ~~[[of]]~~ for storing a list of its neighboring radio sets and data of distance between itself and individual radio sets.

Claim 30 (Currently Amended): The radio communication apparatus as defined in Claim 29, ~~which further comprises~~ comprising:

means ~~[[of]]~~ for acquiring ranging information possessed by other radio sets~~[[,]]~~; and

means ~~[[of]]~~ for deriving the position relative to its neighboring radio sets from the thus acquired ranging information and the ranging information of its own.

Claim 31 (Currently Amended): The radio communication apparatus as defined in Claim 29, ~~which is characterized in that~~ wherein each radio set has means ~~[[of]]~~ for detecting through communication the information about stationary radio sets and then deriving its position relative to the stationary radio sets.

Claim 32 (Currently Amended): The radio communication apparatus as defined in Claim 31, ~~which is characterized in that~~ wherein each radio set has means ~~[[of]]~~ for combining the position information of three or more stationary radio sets with other position information (such as sketch and map) and deriving, thereby mapping, its position or the position of other radio sets on the basis of the position information of other two or more radio sets.

Claim 33 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which further comprises~~ comprising:

means [[of]] for canceling errors resulting from the accuracy of measurements of the prescribed time by the receiving radio set, on the basis of the results of two measurements carried out in such a way that the time required for the receiving radio set to return packets is changed.

Claim 34 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which~~ further ~~comprises~~ comprising:

means [[of]] for filling the gap between the nominal value and the actual value of the time taken from the detection of packets to the transmission of packets by using the result of measurement compared with the known relative distance between the sending and receiving radio sets whose antennas are arranged in a specific relative position.

Claim 35 (Currently Amended): The radio communication apparatus as defined in Claim 20, ~~which~~ further ~~comprises~~ comprising:

means [[of]] for correcting errors of the oscillator by using the result of measurement compared with the known relative distance between the sending and receiving radio sets whose antennas are arranged in a specific relative position.